STUDENT ID NO

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MULTIMEDIA UNIVERSITY

# MULTIMEDIA UNIVERSITY

# FINAL EXAMINATION

**TRIMESTER 2, 2017/2018**

## DPJ5018 – PROGRAMMING IN JAVA

(DIT Students Only)

08 MARCH 2018<br>
9.00 a.m – 11.00 a.m<br>
(2 Hours)

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**INSTRUCTIONS TO STUDENT:**

1. This question paper consists of **17 pages** (excluding cover page) with **3 sections.**

   **Section A**: Multiple Choice Questions
   **Section B**: Structured Questions
   **Section C**: Application Program

2. Write **ALL** your answers in the Answer Booklet provided.

## SECTION A: MULTIPLE CHOICE QUESTIONS (MCQ) (10 Marks)

***Instruction:*** *Answer ALL the questions in this section and shade your answers on the OMR sheet provided.*

1. The __________ provides a small, highly optimized runtime environment for consumer products such as cell phones, pagers and appliances.

   A. Java Standard Edition
   B. Java Enterprise Edition
   C. Java Micro Edition
   D. Java Virtual Machine

2. The `.class` file is called __________.

   A. source code
   B. byte code
   C. class name
   D. Java code

3. Which of the following statements is **INVALID**?

   A. `int hello, bye;`
   B. `float $price = 5.30;`
   C. `double percent1 = 70;`
   D. `boolean class = false;`

4. What will be the value of `score` after the following code is executed?

```
int score, total=150;

if (total > 50)
    score = 200;
else if (total > 100)
    score = 500;
else if (total > 150)
    score = 750;
else
    score = 1000;
```

   A. 500
   B. 750
   C. 200
   D. 1000

Continued...

5. Which of the following statement is **TRUE**?

   A. Constructors must have a return type.
   B. Creating an instance of a class is referred to as class initialization.
   C. Overload method is using the same signature and return type as in its superclass.
   D. Overriding method will be defined when the subclass need to modify the implementation of a method defined in the superclass.

6. Based on the given method header, which statement is **NOT** a valid overloaded method for `multiply`?

```
public static double multiply (int p, double q)
```

   A. `public static int multiply (int p,double`
   B. `public static int multiply (int p,int q,int r,int s)`
   C. `public static double multiply (double p, double q)`
   D. `public static double multiply (int p, double q, double r, int s)`

7. The following are the classes listed under the Exception class **EXCEPT** __________.
   A. IOException
   B. LinkageError
   C. RuntimeException
   D. ClassNotFoundException

8. Class __________ will be thrown if the application has attempted to convert a string to one of the numeric types, but does not have appropriate format.

   A. InputMismatchException
   B. NumberFormatException
   C. RuntimeException
   D. StringIndexOutOfBoundsException

9. The __________ will be called whenever the applet becomes active again once the applet page is revisited.

   A. `init()`
   B. `stop()`
   C. `start()`
   D. `deploy()`

**Continued...**

10. __________ is used by applets to interact with the users.

A. All Writing Tools
B. All Window Tools
C. Abstract Writing Toolkit
D. Abstract Window Toolkit

Continued...

## SECTION B: STRUCTURED QUESTIONS (60 Marks)

***Instruction:*** *Answer ALL the questions in this section and write your answers in the answer booklet provided.*

## QUESTION 1 [20 MARKS]

a) Refer to the following void method named DonationStatus. The method accepts a double array that stores total amount of donations from donors. The method calculates the average of donation amount and display "*Impressive Contributions Received*" if the average recorded is exceed *RM600*, or else will display "*Less Contribution*". You need to complete the code for the parts that are labeled with **(i)** and **(ii)**. [2 marks]

```
public static void DonationStatus (double [] Donate)
{
     double total = 0;

    //(i) using for loop to calculate the total amount of donations received

    double AveDonate = (double)total/Donate.length;

    //(ii) if-else condition to print appropriate status based on average amount
of  donations received
}
```

b) Based on the following array of interest rate, write code that find and displays the lowest rate. [4 marks]

```
double [] interestRate= {3.8, 3.5, 4.5, 4.0};
```

c) Based on ***Question 1(b)***, write code according to following statements:

i. Declare and create a new array which has the same data type (double) and size with the array of interest rate.
ii. Use arraycopy ( ) to copy the values from interestRate array to the new array.
iii. Display all the values of the new array.

[4 marks]

**Continued...**

d) Create a UML diagram for a class named Cookies based on the following details:

i. The `CookiesName` field represents the name of the cookies
ii. The `CookiesCode` field represents the cookies code
iii. The `Flavour field` represents the flavour of the cookies
iv. The `MAX_PACK` field is a constant value of maximum packs are allowed for each buyer
v. Constructor Cookies ( ) constructs an object with parameters: name, code and flav. This constructor also sets the maximum packs to 20 packets
vi. Methods:

- `getCookiesName ()`: returns the name of the cookies
- `getCookiesCode () :` returns the cookies code
- `setFlavour (..)` : assigns the new flavour of the cookies
- `getMaxPack () :` returns the maximum packs for the buyer

[5 marks]

e) Based on ***Question 1(d),*** write the `Cookies class.` [5 marks]

**QUESTION 2 [20 MARKS]**

a) A superclass has the following method [2 marks]

```
public void setYear(int y)
{
        year = y;
}
```

Write a statement that may appear in a subclass that calls this method, passing *2017* as the argument.

b) A superclass has the following constructor [3 marks]

```
public Rectangle (double h, double w)
{
     height = h;
     weight = w;
}
```

A class named `Square` inherits `Rectangle`. Write a public constructor of `Square` with `side (double)` as the argument that calls its superclass constructor and pass the parameter `side` as the height and weight.

**Continued...**

c) What is the output of the following ***Program 2.1 (OnlineQuiz.java)***?

[5 marks]

```
class Coursework
{
    private final double MAXSCORE=50;
    private double score;

public Coursework()
{   System.out.println("Maximum score for CW:"+MAXSCORE);
}

public Coursework(double currentScore)
{
  score = currentScore ;
 System.out.println("Current score:"+score);
}

public double getPercentage()
{   return (score/MAXSCORE*100);
 }
}

class Quiz extends Coursework
{
    private final double MAXSCORE=15;

public Quiz()
{  System.out.println("Maximum score for Quiz:"+MAXSCORE);
}

public Quiz(double quizScore)
{
  super(quizScore);
  System.out.println("Percentage:"+super.getPercentage());
  }
}

class OnlineQuiz extends Quiz
{
    private final double MAXSCORE=5;

public OnlineQuiz(double onlineQuizScore)
{
this();
System.out.println("Online quiz score:" + onlineQuizScore);
}



public OnlineQuiz()
{ System.out.println("Maximum score for Online
Quiz:"+MAXSCORE);
```

Continued...

```
  }
}
public class Q2Test
{
    public static void main(String [] args)
    {
        Coursework cw1 = new OnlineQuiz(4.75);
        Coursework cw2 = new Quiz(13.5);
    }
}
```

***Program 2.1 : OnlineQuiz.java***

d) Write the type of exception that will occur on the following code snippets: [4 marks]

| | Code snippet |
|---|---|
| i. | `int num1=5, num2=num1-5;`<br>`int answer = num1/num2;` |
| ii. | `int number = new Scanner(System.in).nextInt();`<br>`//and user enters “4-1” for number` |
| iii. | `JPanel p1;`<br>`p1.add(new JCheckbox());` |
| iv. | `double [] series = {4.7,1.2,7.8};`<br>`for(int i=0;i<4;i++)`<br>`    series[i]+=1.3;` |

e) Please refer to ***Program 2.2 (ExceptionFinal.java)*** for the following questions. Write the output of the program if the user enters: [6 marks]

i. *6* for the `digit`, *2* for the `level`.

ii. ***five*** for the `digit`, then ***5*** for the `digit` (second input), `0` for the `level`.

```
import java.util.*;

public class ExceptionFinal
{   public static void main(String [] args)
    {
    boolean loop=true;
    do{
     try {
System.out.print("Enter the last digit of your IC number: ");

 int digit = new Scanner(System.in).nextInt();

System.out.println(digit+" is "+checkGender(digit));
```

Continued...

```
System.out.print("Enter your security level: ");

 String level = new Scanner(System.in).next();

if(level.equals("0"))
                  throw new
     IllegalArgumentException("Illegal argument.");

      else {
      loop=false;
     int no = Integer.parseInt(level);
     int [] randomCode = new int[no];

     for(int i=0;i<no;i++)
     randomCode[i] = i*no;

System.out.print("Your password is: "+randomCode[no]);
             }
       }//try

     catch(NoSuchElementException e){
System.out.println("Wrong element. Repeat.");
       }

     catch(ArrayIndexOutOfBoundsException e){
System.out.println("Opps! Illegal index.");
      }

      catch(RuntimeException e){
System.out.println("Gotcha! "+e.getMessage()+" Operation
aborted.");

     loop = false;
           }

         }while(loop);
     }//main

public static String checkGender(int no){
    String gender;

    if(no%2==0)
         gender = "Female.";
    else
          gender = "Male.";

          return gender;
     }
}//class
```

*Program 2.2 : ExceptionFinal.java*

**Continued...**

## QUESTION 3 [20 MARKS]

a) Explain about `AWT` and `Swing` packages. [2 marks]

b) List **THREE** groups of Graphical User Interfaces (GUI) classes. [3 marks]

c) Write Java code to accomplish the following tasks: [10 marks]

i. Create a panel and set the panel's color background to blue.

ii. Create a non-editable text field with a default text "Malaysian".

iii. Create a button using an icon image. The image name is "pause.png".

iv. Create a list that contains the following items: Java, PHP, C++ and SQL. Only one item can be selected from the list at a time.

v. Create a text of "*Java World*" having the following features: Arial, size 11, italic style.

d) Write Java code to create a combo box as shown in ***Figure 3(a)*** [5 marks]

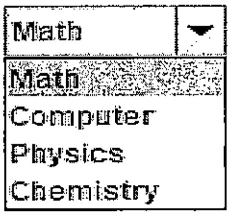


*Figure 3(a):Combo box*

**Continued...**

## SECTION C: STRUCTURED QUESTIONS (30 Marks)

*Instructions: Answer* ***ONE (1)*** *question only. Write your answers in the Answer Booklet provided.*

### QUESTION 1 [30 MARKS]

In a factory, a factory worker is a salaried employee who is eligible to work overtime for every month in a year. A factory worker whose post is as a supervisor could earn a yearly bonus when his or her overtime reaches certain hours. The following application is designed based on this situation.

Refer to the UML class diagrams as shown in ***Figure 1(a)*** for the following instructions:

a) Write a class named `Employee` that consists the following fields and methods:

*Class fields:*

i. `employeeID` field represents the ID of the employee.

ii. `employeeName` field represents the name of the employee.

*Constructor:*

iii. `Employee ()` constructs an object with two parameters: `employeeID` and `employeeName`, and set the data with the class fields.

*Methods:*

iv. `getID()`: returns the ID of the employee.

v. `getName()`: returns the name of the employee.

b) Write a class named `FactoryWorker` that inherits `Employee` class

*Class field:*

i. `monthsOTHours` is an array field that represents the number of overtime hours in a year for the employee.

*Constructor:*

ii. `FactoryWorker` constructs an object with parameters: ID, name and overtime hours. This constructor calls the superclass's constructor to set the ID and name for this employee. This constructor also should assign the overtime hours to the class field `monthsOTHours`.

*Method:*

iii. `getMonthsOTHours` return the array field of number of overtime (`monthsOTHours`) for the employee.

**Continued...**

c) Write a class named Supervisor that inherits FactoryWorker class

*Class fields:*

i. avgOT field represents the average of overtime hours that the supervisor achieves.

ii. bonus field represents the annual bonus that the supervisor gets based on the average of overtime hours for the supervisor.

*Constructor:*

iii. Supervisor constructs an object with parameters: ID, name and supervisor overtime hours (an array). This constructor calls the superclass's constructor to set these parameters for the supervisor.

*Methods:*

iv. getAverageOT calculates and returns the average overtime for this supervisor. You should call the superclass's method (getMonthsOTHours) to retrieve the overtime hours. To calculate the average, sum up the overtime hours and calculate the average.

v. getAnnualBonus returns the bonus for the supervisor based on the average overtime. Refer to Table 1:

| Average Overtime (hours) | Bonus (RM) |
|---|---|
| 30 and more | 800.00 |
| 20 and more | 500.00 |
| 10 and more | 200.00 |
| others | 0 |

Table 1 : Bonus Reward

d) Then write an application program to test Supervisor class.

i. Prompt the user to enter the supervisor ID and name.

ii. Create an array of overtime for 12 months and prompt the user to enter the number of hours for each month to be stored in the array.

iii. Create an object of Supervisor with the parameters of supervisor ID, name and overtime (*that user entered earlier*) as the arguments.

iv. Then display the record of the supervisor with these data by calling the appropriate methods:

- Supervisor ID
- Supervisor name
- Average overtime of the supervisor in that year.
- Annual bonus for the supervisor for that year.

You may refer to the sample output as shown in ***Figure 1(b)***.

Continued...

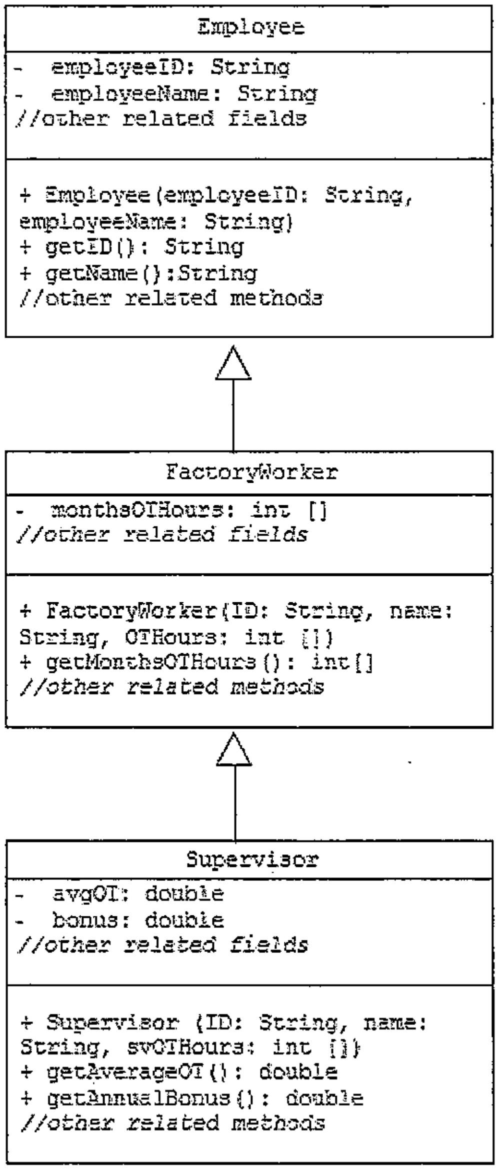
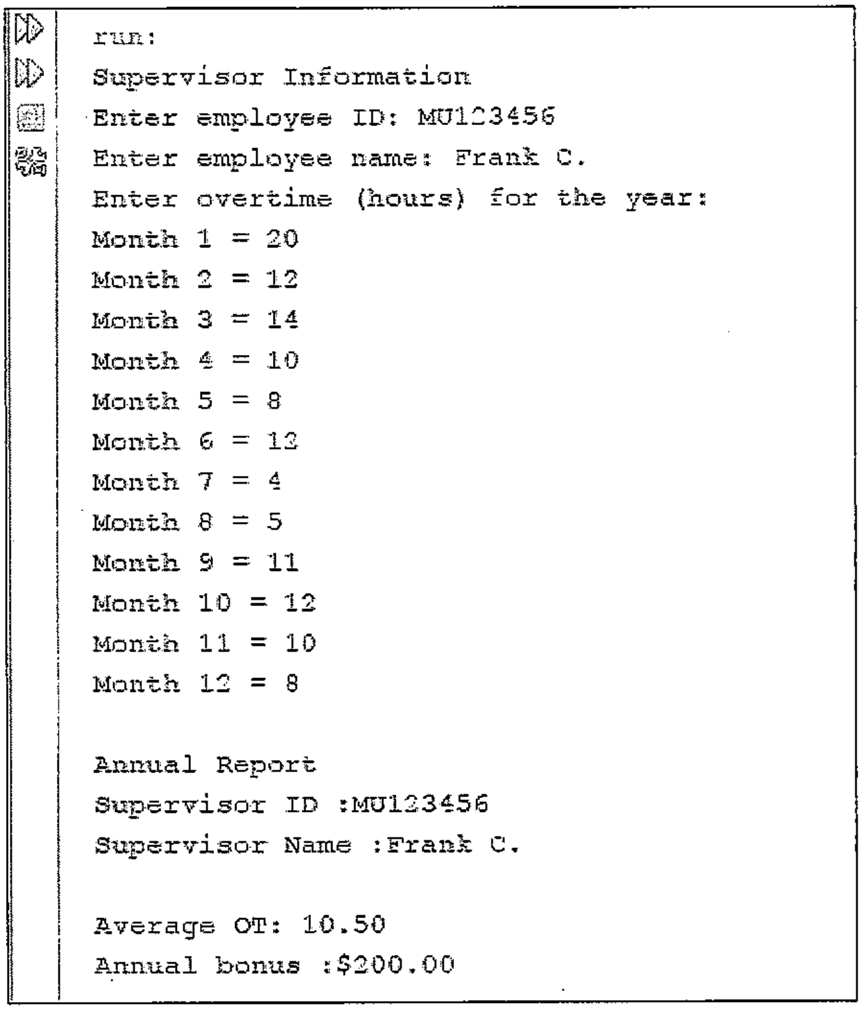


*Figure 1(a): UML class diagram for Employee, FactoryWorker and Supervisor*

**Continued…**



```
run:
Supervisor Information
Enter employee ID: MU123456
Enter employee name: Frank C.
Enter overtime (hours) for the year:
Month 1 = 20
Month 2 = 12
Month 3 = 14
Month 4 = 10
Month 5 = 8
Month 6 = 12
Month 7 = 4
Month 8 = 5
Month 9 = 11
Month 10 = 12
Month 11 = 10
Month 12 = 8

Annual Report
Supervisor ID :MU123456
Supervisor Name :Frank C.

Average OT: 10.50
Annual bonus :$200.00
```

*Figure 1(b) – Sample output*

**Continued...**

## QUESTION 2 [30 MARKS]

Write an application that displays an image of car logo. The user selects the car manufacturer from a **drop-down button**, and **the text (tagline) with logo of the car** will be displayed based on the selection. Refer to **Table 2** for the name, text and file name:

| **Car Manufacture** | **Tagline** | **Image file name** |
|---|---|---|
| Toyota | All About The Drive | toyota.jpg |
| Honda | The Powers Dreams | honda.jpg |
| Nissan | Innovation That Excites | nissan.jpg |

*Table 2*

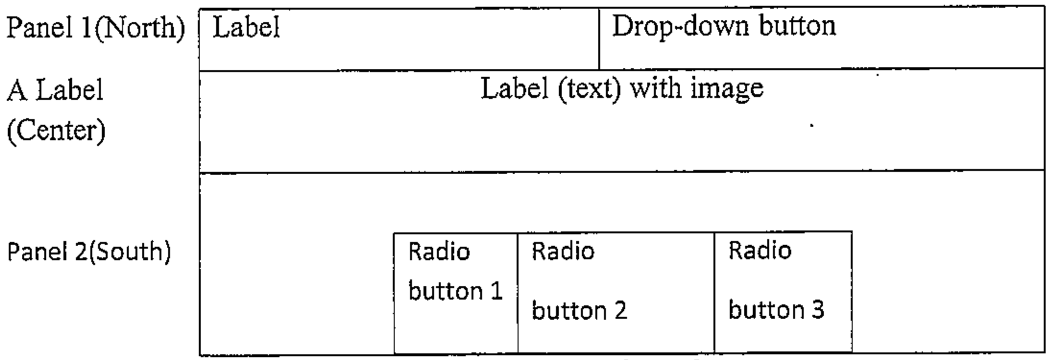
There are **three radio buttons** to change the **alignment of the text and image.** The radio buttons can only be selected exclusively.

***Other details for this program are:***

- The size of the frame is 500 x 300.
- The **default text** is "It's Not Just A Car..." with an image file name: "car.jpg". The text is at the **top** of the image with centered horizontal alignment.
- Font for all texts is Courier, plain style and size 15. **EXCEPT** for:
    - Default text: Bold style and size 20.
    - Text of tagline/slogan: Impact, plain style and size 20. The text is in **blue** color.
- The text of tagline/slogan is at the **bottom** of the image.
- The background color of Panel 2 is **blue.**

You may refer to the layout panel in ***Figure 2(a)***, and the sample output as shown in ***Figure 2(b), 2(c), 2(d) and 2(e).***

**Continued...**



Panel 1(North)

Label

Drop-down button

A Label (Center)

Label (text) with image

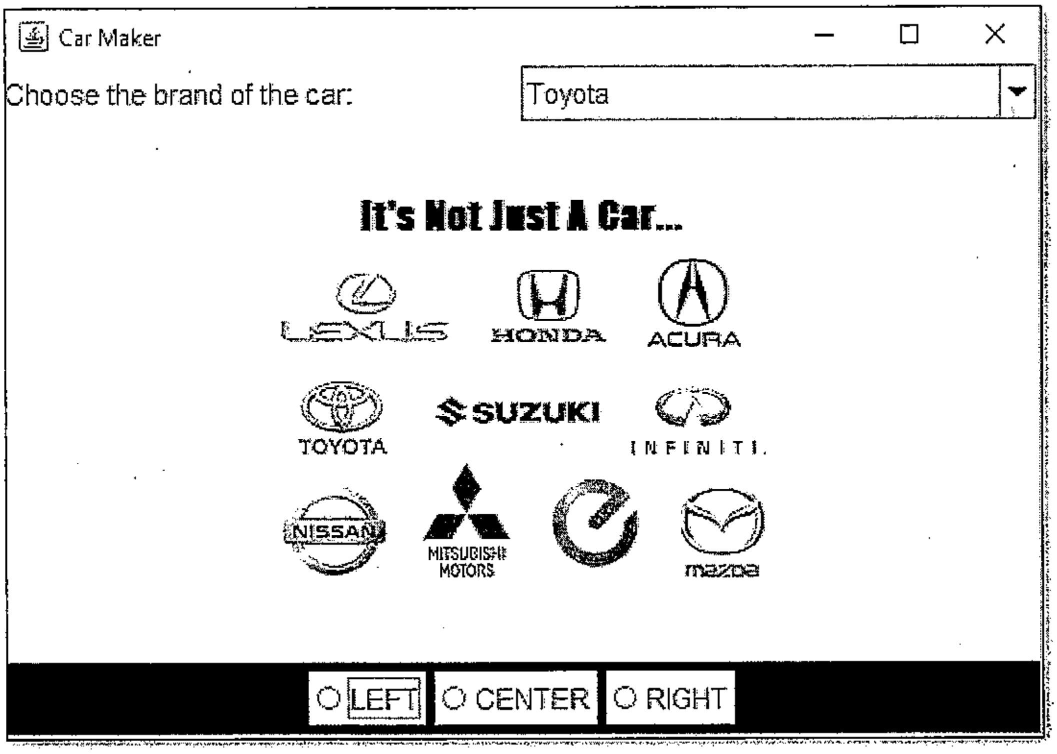
Panel 2(South)

Radio button 1

Radio button 2

Radio button 3

*Figure 2(a): Layout of Panels*



Car Maker

Choose the brand of the car:

Toyota

It's Not Just A Car...

○ LEFT ○ CENTER ○ RIGHT

*Figure 2(b) : Default Image and Slogan*

**Continued...**

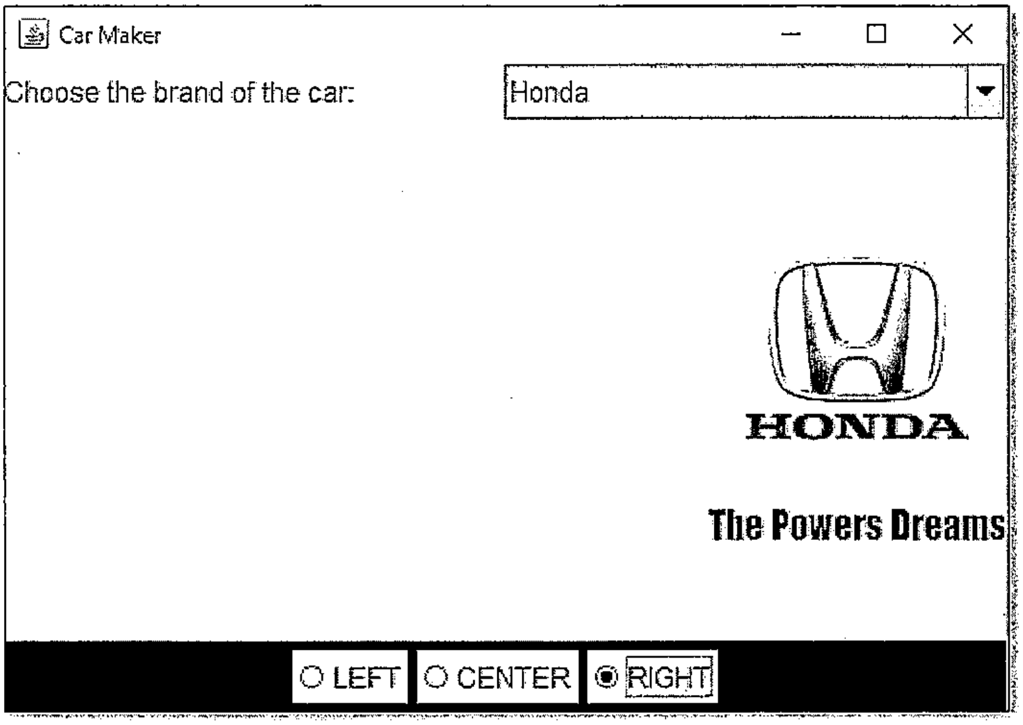


*Figure 2(c): Right Alignment*

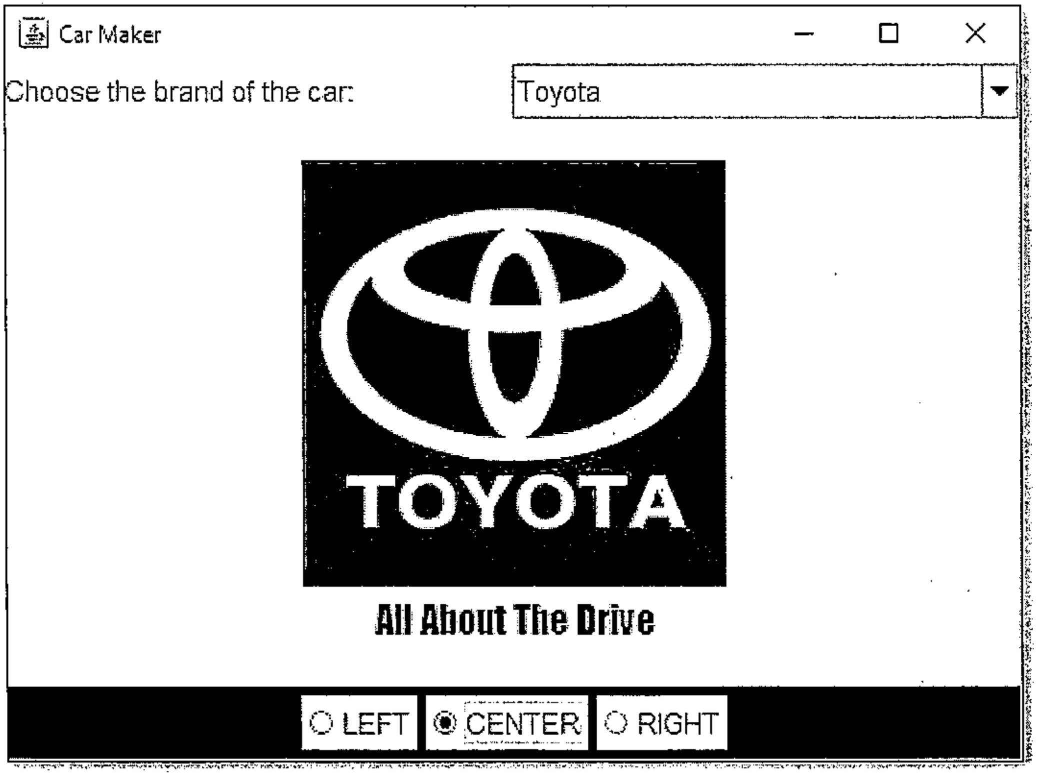


*Figure 2(d): Center*

**Continued…**

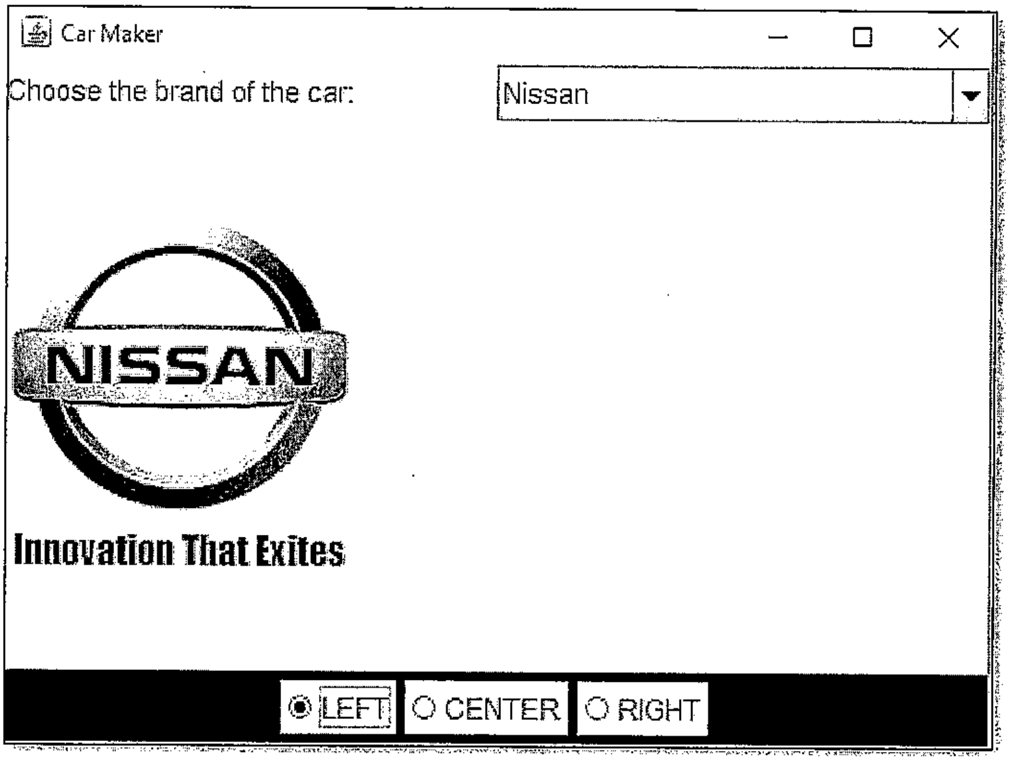


*Figure 2(e): Left Alignment*

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